Architectural Thesis

TEXT

Architecture

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DESIGN FOR AN ACADEMY OF ARCHITECTURE

BY

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THESIS

For the Degree of

BACHELOR OF SCIENCE

IN ARCHITECTURE

COLLEGE OF ENGINEERING

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THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

WILLIAM PHILIP DOERR

ENTITLED DESIGN FOR AN ACADEMY OF ARCHITECTURE

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF Bachelor of Science in Architecture

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HEAD OF DEPARTMENT OF Architecture

AN ACADEMY OF ARCHITECTURE.

PROGRAM.

In a large university located in the heart of a great city, it is proposed to build a monumental building devoted to the study of architecture. The site available is 500'x500' and is bounded on four sides by streets of approximately equal importance.

In general the building will not only be conveniently planned but will exemplify in every respect the best principles and traditions of the art to whose service it is dedicated.

The building will be essentially a school, but as its object is to exhibit the work of the students, its entire first floor will be given up to exhibition space. Principal rooms will be a large museum, high enough to contain full size models of architecture approximately 17000 square feet. An auditorium with a small stage and retiring rooms, large enough to seat 500 people. Exhibition rooms for the exhibition of architectural drawings, approximately 8500 square feet. A museum for the exhibition of building materials, 2300 square feet.

Draughting rooms for the various classes to allow 50 square feet floor area per man and to provide for the following number:

Freshman- - - 40

Sophomores - -30

Juniors - - - 25

Seniors - - - 15

Post Graduates - 10

Total - - - - - 120

Offices for the faculty which will have the following importance:-

The Dean of the college.

The Professors in Architecture.

The Professors of Architectural Engineering.

Two assistant Professors of Architecture.

Two instructors in water color and pen and ink.

Two assistant Professors in Architectural Engineering.

A Librarian and an assistant.

Of these each professor and assistant will have a suite of rooms, to consist of a private office and draughting room.

There should be ample toilet accommodations in the different stories and locker rooms for the students in the upper stories.

The building will be three stories and a basement in height.

In general the exhibition rooms will occupy the first story, the recitation rooms and the offices the second story, and the draughting rooms and studios the third story.

All cultural and mathematical studies will be taught in other buildings and no provisions need be made for them in this building.

AN ACADEMY OF ARCHITECTURE.

Grouping of Masses.

The planning of an Academy of Architecture is a problem in grouping of two or more masses. The greatest main divisions of this building are the public or exhibition space and the school proper. The public space comprises exhibition halls and auditorium. The school consists of studios, library, and offices.

According to the best designs of academies of fine arts the ideal solution seems to be a one story building as shown in the accompaning blue print. On blue print (1) the two main masses (public space and school space) are connected by a large auditorium, in this way keeping the more secluded parts away from the public space and still giving the students free access to all parts of the building.

Another solution of this problem which might well be considered, being limited to ground area, is more practical than the first solution. In this solution there are several stories, the first being given up to exhibition while the upper floors are devoted to studios, offices, ateliers, etc. While this solution is not as ideal as the former, it is far more convenient, since its parts are not spread over so great an area. This gives it a compactness which makes it very desirable from a practical standpoint. It also limits the use of the first floor to the public and permits the students to use the entire building without any inconvenience.

Entrances.

In the first solution as shown on the blue print (1)

there are two main entrances, one to the school proper and the other to the exhibition or public space. They should be so located as to indicate their purpose. The public entrance perhaps occupying the more prominent position on the plan, while the school entrance occupies a more secluded position. In this way all congestions between students and visitors are avoided.

The public enters directly through a large hall of casts, which makes a very dignified as well as interesting means of approach. Directly opposite this entrance is that of the students, which is flanked on both sides by studios and lecture rooms.

Studics and Lecture Rooms.

The studios and lecture rooms are grouped on both sides of the school entrance, forming an open court. The studios or life classes are rooms about 25' - 0" square, seating arranged on the hemicycle plan with a platform in the center for models, lighted from above. The students arrange themselves about the model as closely as possible. The ateliers are varied in size according to the purpose for which they are intended, sculpture, painting, etc.

Hall of Casts.

A large monumental room dignified in character, several stories in height, sufficiently large to contain full size models of some of the most important historical examples of architecture and sculpture. It forms the main mass of the building and should be lighted from above.

The auditorium forms a very satisfactory connecting

link between the public and the working space. In this position it is equally accessible to both students and public, being centrally located it becomes a prominent feature in elevation.

The Library.

The library should be centrally located in the school portion and should be used only by students and instructors. There is no objection, however, to having the public admitted.

LIGHTING OF PICTURE GALLERIES.

A picture is well lighted when the full direct light from above, coming from a single skylight, falls directly upon it in such a manner as to catch an entire flash of uniformly strong light. It is also well lighted when the light falls on the picture at 45° at least, or not on a reentering angle and where the intercepted rays cannot succeed in striking the observer's eye who is standing opposite the picture. Therefore a gallery is well lighted when all the pictures catch such a light of uniform intensity; also when the picture walls are uniformly lighted. In picture galleries with overhead light, the eye of the observer must be protected against reflected light and, outside of the skylight, no part of the room should have stronger light than the picture.

A clear method for useful array of skylights in museums was first used in the Art Museum by Professor Edward Magnus Erdkam's Zeitschrift für Bauwesen, 1864-1866.

Likewise this also assures, according to figure 1, the relation of the width of the room to height as 7 : 5; this is seemingly too low from an architectural standpoint.

The width of an overhead light, according to Magnus, is equal to one third of the breadth of the room and the height of the picture wall he takes at 15 feet, the horizon at 5 feet. Figure 1 shows a wall with a number of rays drawn in, shown at a height of 8' - 4" from the floor, the greatest angle; here also the light is the brightest, becoming weaker toward the top and bottom. The relation of ceiling openong width to width of room should be 1 : 3. Professor Magnus discovered from

the observations and comparisons of different light effects, in order that the same would give uniformly bright light on the picture wall, the harmful high light be entirely avoided.. With larger light openings, brighter light is obtained, but much more unevenly divided light, with a strong reflection from the floor and walls; smaller openings on the contrary avoid these undesirable effects, in that the rays fall more steeply. The same however gives a diffused light. The method of Proffessor Magnus offers a sufficiently large light space for long picture galleries and for short square halls it offers much too small an opening. With a square room 30' wide, the skylight will attain a width of 9' - 6" and then the relation between the plane of the skylight to the floor of the gallery would be as 3x3 : 9x9 equals 1 : 9, which is very much too small, for a relation of 1 : 4 to 1 : 3 must exist for sufficient lighting which relation besides is dependent upon the height of the gallery while the opening in the ceiling must become just that much wider the higher the gallery. In addition to the method proposed by Professor Magnus for determining the width of skylights, A. Liede has put into practice a different method by an arrangement of a skylight court in the Museum at Berlin which is shown with reference to the picture walls. The hall is 35' - 0" wide and 25' - 0" high whereas the skylight is still a trifle higher. The picture wall which begins 30" above the floor extends 14' - 0" high so that the heigest picture can easily be seen. The ceiling space is determined by Liede as follows; he bisects the

picture wall, erects the perpendicular (see figure 2) to (b), which is on the central axis of the hall, describes a circle about (b) which cuts the picture at (e) and (f) from which the arc (cd) gives the width of the opening of the ceiling. All arcs being parts of the arc (ef), which pass through this opening and strike the picture wall as falling rays must produce equal angles, for these angles all occupy the same arc (cd). Now that the picture wall stands just a little distance from the circle it will probably be equally lighted, for the stength of the light is the same above as below while it is just a little stronger at the middle.

Picture walls receive good light only when the direct light from the sky can fall upon them after the light has passed through a light opening in the ceiling which should be studded with pale colored glass or dull glass. Therefore the correct location of the skylight is very important. In the galleries at Cassel, Baurath Von Dehn Rotfelser designed the skylights as shown in figure 3. Here (af), the skylights, through which the direct light through the opening in the ceiling, strikes the picture wall at an angle of less than 45°, while the distributing light from the zenith is softened by means of the darkened covering on the ridge of the roof (aa), which, naturally is visible from beneath through the dull skylight. The windows in both planes of the roof warrant the use of light hangings of natural colored linen which are necessary for softening the strong light of the sun. In figure 3 it is true that direct light can fall on the picture wall between the lines (ab) and (cd); but it is favorable

for good lighting that the windows extend farther up than (c) and should also extend farther sideways away the skylights. Professor Magnus takes one half the height of the picture wall, through the boundary of the light opening which, in figure 3, is represented by the line (ef), and suggests that the whole space cut out of the roof between (f) and (f) should be covered with glass.

According to the observations of Baurathes Von Dehn-Rotfelser it is desirable to take the point (e) higher up for he lays stess on the fact that it is best to allow the roof light to enter sufficiently to convey enough direct light around the picture zone. Again, the same man considers it not harmful but on the contrary very advantageous for the lighting when an area directly in the middle of the roof is left opaque for in this way light is taken away from the floor and distributed around the room. Light entering directly blinds the eyes and disturbs the quiet peaceful admiration of the pictures, while, the floor remains so dark the walls appear very light by contrast.

For this reason a form of Mansard roof has been worked out (Figure 6) with glass pyramids as in the case of the Pinakothek in Munchen; the glass is covered also with sheets of bronze so that the light can only enter from the lower plane of the prisms. As is seen from figure 6 these glass pyramids have been adapted to teh buildings in Zierde and also in the Art Museum at Bern. In the main room of the Art Gallery in Antwerp where the zenith is dark an excellent method of lighting took place although the skylights which

were later made larger were very small.

Where the zenith light in rooms which have light direct from skylight cannot be softened the floor must under all circumstances be kept dark and dull by which the reflection of rays of light is very much decreased and is an all-round advantage. Arrangements for modifying the zenith light (page 879 Grundrissvorbilder Volume 10) in Rottmanns Hall are not recommedable because they disturb too much space. After it has been attempted to ward off the zenith light by putting a piece of so-called velum made of transparent cloth material over the roof light; but by this method the architectural arrangement of the room is interfered with; such an arrangement was used in the upper halls of Art Gallery in Dusseldorf.

In the Reichs Museum in Amsterdam, Architect Cuypers arranged the roof light as shown in figure 4. Here the steep planes of the Mansard roof hold the windows while the upper portion of the roof is dark. By this means the direct light can fall from two directions on the picture wall but the dark zenith seen in the roof light above produces architecturally a poor effect. Two large newly installed skylights in the Louvre in Paris by Architect Lefuel are patterned after the interior decoration and color arrangement, by which arrangement the paintings are very much improved. The lighting of the hall is also very satisfactory; only the top light is a little too broad and for this reason one must incline the picture on the upper part of the wall somewhat to the front. The walls are as high measured up to the horizontal ceiling light, as they are broad and the width of the ceiling light is almost half

the width of the hall. In figure 5 the dull glass covering is set into a rich golden frame (bc) and the ceiling vault, which has a radius of 1/6 the height of the hall butts into this. The golden frame is so jcinted that it cannot absorb any rays of light from the picture wall and so that it does not offer any reflecting surface to the light. From the windows on both sides of the roof the southern exposure to very intense light is easily taken care of by transparent paint by means of which hangings can be avoided. The Louvre Halls served as a pattern when the Gallery at Brussels was remodeled and they also served as models when Baurath Von Dehn Rotfelser built the Gallery at Cassel.

The requirements of a school of Architecture may be stated as follows:

The application of central corridors with rooms on both sides should be avoided, on account of the difficulty of lighting such a cooridor.

The width of a corridor should be at least 10 feet. Lecture and drawing rooms should, if lighted on only one side, have no greater depth than 30' - 0", because the rear part of the room would be insufficiently lighted.

For larger lecture rooms a depth less than 30' - 0" is not advisable, because in this case they would have to be long to look well.

Draughting rooms should face north as north light is the steadiest and more evenly diffused light.

Rooms belonging to each individual course of instruction, lecture rooms, draughting rooms, etc., should be grouped together as nearly as possible.

The library should be centrally located and preferably near the draughting rooms.

The library should not face either south or west, because sunlight is not favorable to the preservation of books.

The office of the librarian should be situated between the library and the reading room, so the entrance to this is only possible through the former.

Halls should not be tinted in bright colors as they may be used for exhibitional purposes.

Besides one main stairway centrally located there should be less important stairways.

It is not advisable to have outside stairways, these stairs to the main floor should be put in the entrance hall, stairways should not be placed in corridors if possible.

LECTURE ROOMS-

The width of a seat in the lecture rooms should be at least 24", the length in front for seat and desk 3' - 0". The single rows should be arranged for three to four students.

The passageway between rows of seats should be at least 2' - 0" wide. The side aisle next to the wall should be at least 3' - 0".

The desk in front of the teacher's platform should be 3' - 0" wide, the distance of this desk from the blackboard should be 3' - 6".

Between the desk of the teacher's platform and the first row of seats there should be a passage of 2' - 6" wide. Rear aisle should be 3' - 0" wide.

The length of lecture rooms should not exceed 45' - 0", so that not more than 12 consecutive rows of seats could be placed behind each other.

In larger lecture rooms, which have the light from both sides the seats should be arranged in circular form, in those having light from one side only the light should come from the left side.

DRAUGHTING ROOMS-

The width of the drawing boards toward the light should be 2' - 6", space between boards 3' - 6".

In all draughting rooms there should be a space of 10' - 0" between the front row of boards and the wall for

the placing of models.

DATA TAKEN FROM THE PRINCIPAL AMERICAN ACADEMIES OF ARCHITECTVRE

SCHOOL	FREE HAND DRAWINGR. AREA	DRAFTING ROOM AREA	LECTVRE ROOM AREA.	LECT. ROOM AREA PER STVDENT	LIBRARY AREA	NO. OF STVDENTS	DRAFT. ROOM AREA PER STVDENT	
PENNSYLVANIA		6960 □'	1500 □'	10 □'	2300	155	45 □'	
BOSTON TECH	3640	7600	5100	34	2560	150	50	
ILLINOIS VNIV.	2000	3640			600	125	30	
HARVARD	2100	5400	2580	26	1200	100	54	

No 4

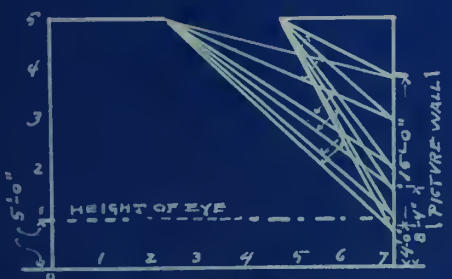


Fig. 1 ARRANGEMENT OF WALL LIGHT (AFTER MAGNUS)

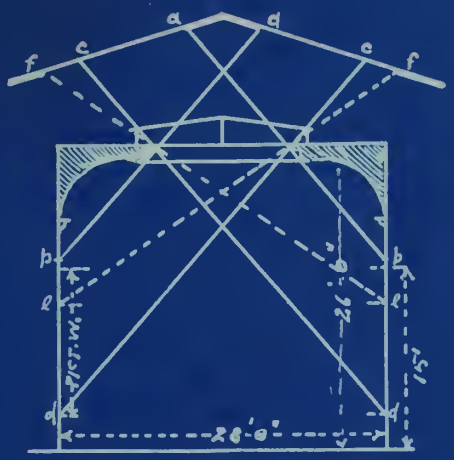
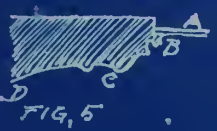


Fig. 3. OVERHEAD LIGHT AFTER JEHN-ROTFELSER



FIG, 5

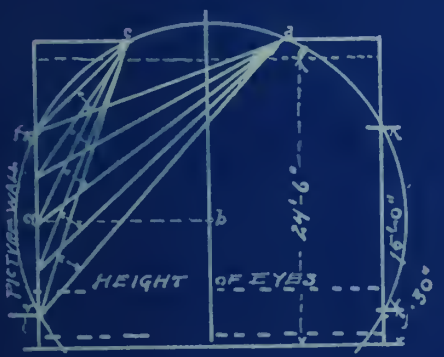
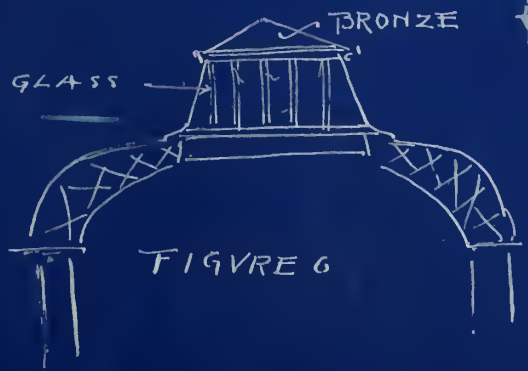
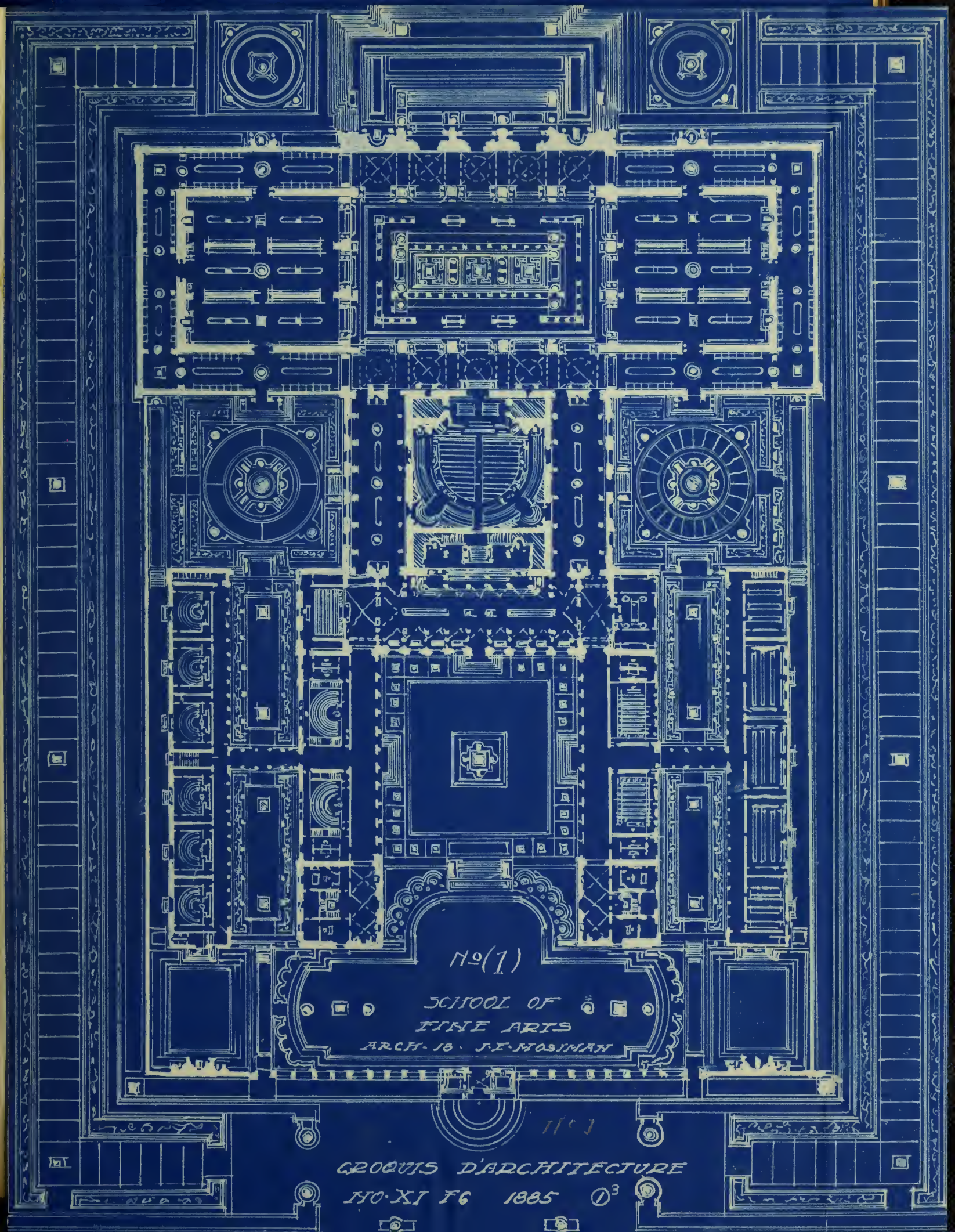


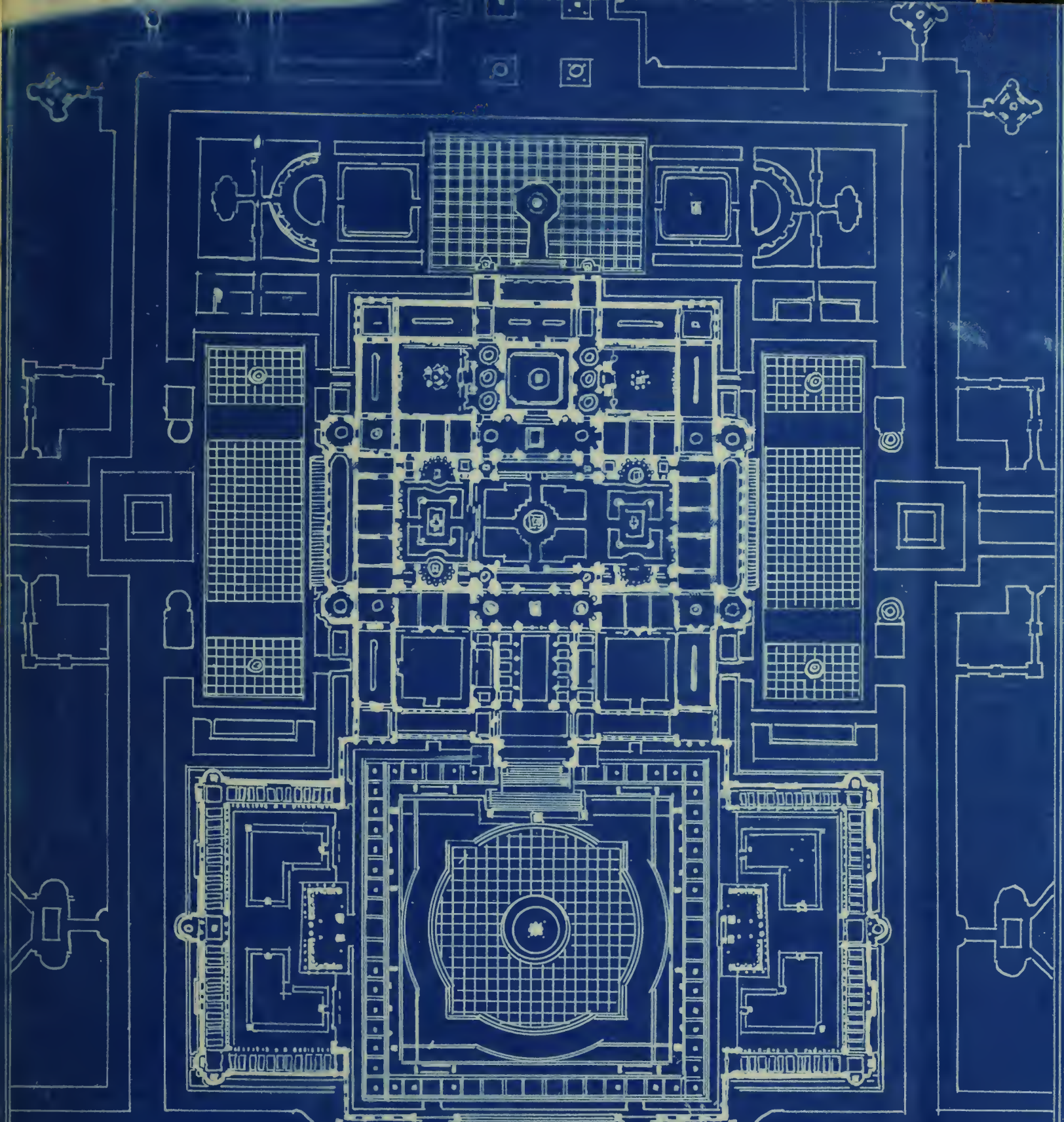
Fig 2.

Fig. 4 OVER HEADLIGHT AFTER CVYPERS.



FIGVRE 6





UN PALAIS POUR L'EXPOSITION DES BEAUX ARTS.-Mr. BÉNARD.

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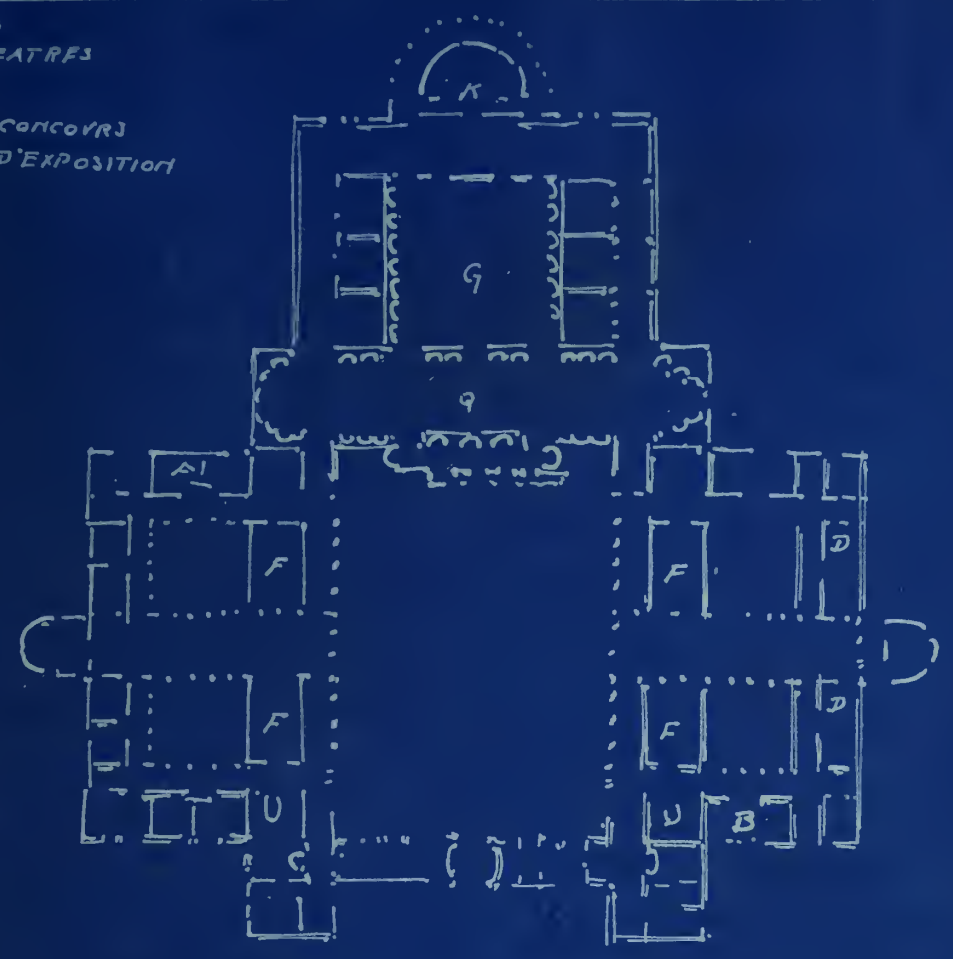
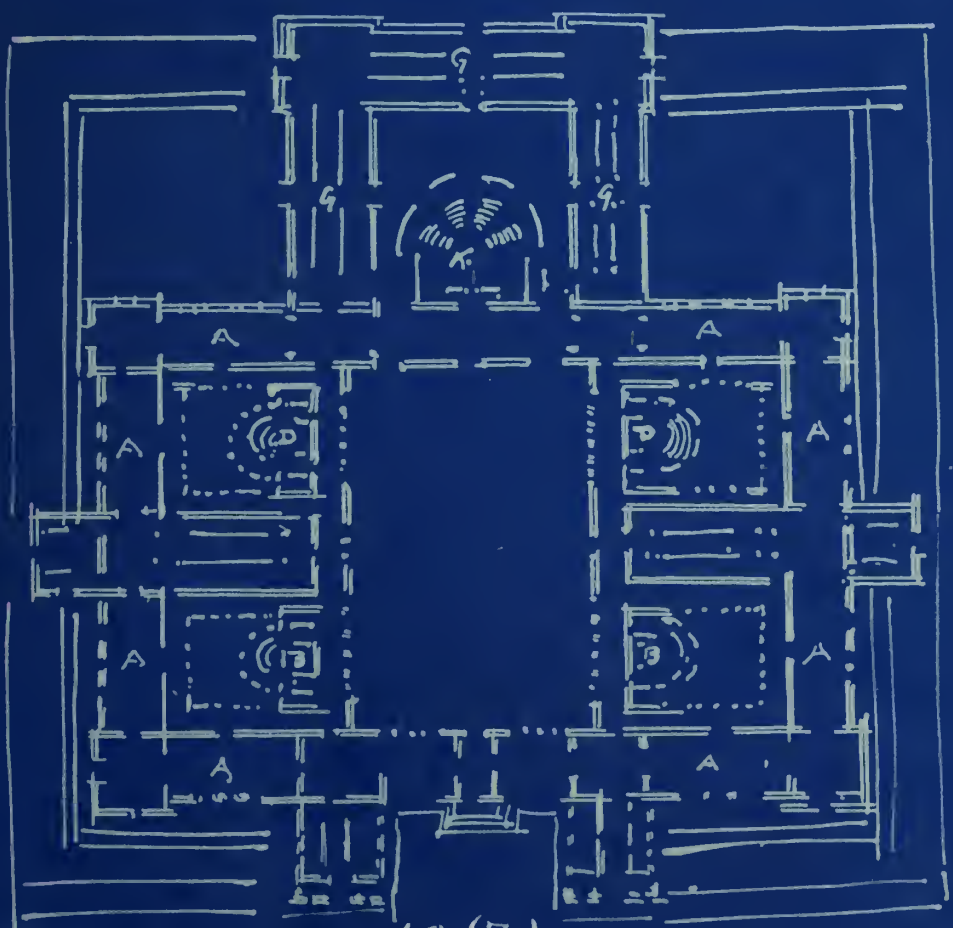
GUY-VAN-DOREN-'10

A ATELIERS
B AMPHITHEATRES
C "
D "
E SALLS DE CONCOVRS
F GALERIES D'EXPOSITION
G MVSEE





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